UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/649,056 | 08/27/2003 | Arthur J. Epstein | OSU1159-059H | 4936 |

8698 7590 07/12/2004

STANDLEY LAW GROUP LLP
495 METRO PLACE SOUTH
SUITE 210
DUBLIN, OH 43017

| EXAMINER | |
|---|---|
| YAMNITZKY, MARIE ROSE | |
| ART UNIT | PAPER NUMBER |
| 1774 | |

DATE MAILED: 07/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/649,056 | EPSTEIN ET AL. | |
| | Examiner | Art Unit | |
| | Marie R. Yamnitzky | 1774 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *26 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) *1-6 and 11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-10 and 12-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper ~~No(s)/Mail Date~~ *rec'd 26 Apr 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. Applicant's election without traverse in the reply filed on April 26, 2004 is acknowledged. Applicant elects species II, rotaxanes, in which the chain has the structure represented by the sixth formula in claim 12 wherein Y is $CH_2$, u is 1, w is 2 and R is an alkyl group comprising 6 carbon atoms, and in which the ring about the chain is a ring comprising a quinoline group.

Claims 7-10 and 12-16 read on the elected species. In setting forth the election of species requirement, chains having one of the structures set forth in claim 13 were indicated as patentably distinct from chains having one of the structures set forth in claim 12. However, a rotaxane having the chain of the sixth formula in claim 12 will also meet the limitations of a rotaxane having a structure represented by the first formula in claim 13 wherein each of $R_1$-$R_3$ is hydrogen, given the open language "having" in claim 13. Accordingly, claim 13 reads on the elected species.

2. Claims 1-6 and 11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 26, 2004.

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

The specification to which the oath or declaration is directed has not been adequately identified. See MPEP § 601.01(a).

It does not state that the person making the oath or declaration has reviewed and understands the contents of the specification, including the claims, as amended by any amendment specifically referred to in the oath or declaration.

The declaration identifies the specification which has been reviewed and understood as being the specification filed on July 29, 1997 as Application Serial No. 08/901,888. While the transmittal letter and the present specification identify the present application as being a divisional of 08/901,888, a review of the present application versus the prior application shows that the present application discloses subject matter not disclosed in the prior application. See page 6 of the election of species requirement mailed 03/24/2004 for subject matter disclosed in the present application that is not disclosed in the prior application.

Based on the declaration filed August 27, 2003, it is not clear that the persons making the declaration have reviewed and understand the contents of the specification, including the claims, of the present application.

4. The disclosure is objected to because of the following informalities:

Paragraph [0001] identifies the present application as a divisional application of prior application No. 08/901,888. Since the disclosure of the present application contains subject matter not disclosed in the '888 application as previously noted, the present application is a continuation-in-part, rather than a divisional, of the '888 application. Correction is required.

5. Claims 7-10 and 12-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "sufficiently" and "substantially" are relative terms that render the claims indefinite because insufficient guidance is given in the specification to determine the scope of limitations associated with these terms. The scope of "a sufficiently deaggregated state" and the scope of substantial prevention of redshifting and lowering of light emission efficiency are not clear. How deaggregated is a "sufficiently deaggregated state"? How much redshifting and lowering of light emission efficiency must be prevented to meet the limitations of the last three lines of claim 7?

The limitation regarding substantial prevention of redshifting and lowering of light emission efficiency is also unclear because it is not certain what the comparison point is. That is, redshifting is substantially prevented compared to what; lowering of light emission efficiency is substantially prevented compared to what? In view of references of record in the parent application, redshifting results from aggregation which is morphology dependent and is minimal in "powder" samples. The present claims are drawn to a light-emitting polymeric material or a device comprising the polymeric material. There is no limitation on the morphology of the polymeric material.

Claim 8 is confusing. It is not clear if the layer of an electron-blocking polymer is part of the light emitting polymeric material, or if the light emitting polymeric material is part of a layer of an electron-blocking polymer, or if the light emitting polymeric material functions as a layer

of an electron-blocking polymer, or if the light emitting polymeric material comprises at least two layers (one layer being a layer of an electron-blocking polymer and another layer being a layer comprising said rotaxanes).

Claim 10: There is no antecedent basis for "said electron transporting polymer".

Claim 12: The variable "n" in $(CH_2)_n$ is not defined.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 7, 10, 14 and 15 are rejected under 35 U.S.C. 102(a) as being anticipated by Nepal et al. in *Macromolecules* 2003, 36, pp. 3800-3802 (published on Web 04/30/2003).

The subject matter of present independent claim 7 and claims dependent therefrom is not supported by prior application 08/901,888. Accordingly, the subject matter of these claims is considered to have a U.S. filing date of August 27, 2003.

Nepal et al. disclose a light emitting polymer which is a rotaxane comprising a polyazomethine chain having cyclodextrins extending about the circumference of the chain. For example, see Scheme 1 on page 3801. Based on the structure of the polymer and the teachings in the paragraph bridging the two columns on page 3802, it is the examiner's position that it is reasonable to expect that Nepal's light emitting polymer is capable of producing

electroluminescence upon being provided with a flow of electrons. Based on the structure of the polymer as depicted in Scheme 1, it is the examiner's position that it is reasonable to expect that the polyazomethine rotaxane exhibits less aggregation than a polyazomethine without the cyclodextrin, and is inherently capable of meeting the limitations set forth in the last three lines of claim 7 compared to a polyazomethine without the cyclodextrin.

With respect to claim 10, Nepal et al. suggest that the light emitting polymer may be useful as an electroluminescent polymer. A source of electrical current is necessary in order to obtain electroluminescence. One of ordinary skill in the art at the time of the invention could have at once envisaged a light emitting device comprising Nepal's polymer and a source of electrical current.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nepal et al. as applied to claims 7, 10, 14 and 15 above, and for the further reasons set forth below.

Nepal et al. suggest that the light emitting polymer may be useful as an electroluminescent polymer. The basic structure of an electroluminescent device requires a pair of electrodes and a light emitting material. Various conductive and semi-conductive materials

are known in the art to be useful for forming electrodes, including conductive and semi-conductive polymers. It would have been within the level of one of ordinary skill in the art at the time of the invention to provide an electroluminescent device as suggested by Nepal et al. utilizing known conductive and semi-conductive materials for the electrodes.

10. Applicant is advised that should claim 7 be found allowable, claim 15 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Giving the term "rotaxane" its conventional meaning, claim 15 places no further limitations on the claimed subject matter.

11. The references made of record and not relied upon are considered pertinent to applicant's disclosure.

Hsieh et al. (US 5,945,502) disclose electroluminescent polymers and devices. Hsieh et al. disclose "rotaxanes" as an example of an ion binding group that may be a substituent on the polymer. See column 5, lines 49-61 and c. 20, l. 6-10. Insufficient information is provided in the Hsieh patent to determine if Hsieh's rotaxanes would meet the limitations of the present claims.

Michels et al. (*Chem. Eur. J.* 2003, 9, pp. 6167-6176) disclose polymers meeting the limitations of present claim 7 and 13-15 and teach their use in a light emitting device. However, the article by Michels et al. is not available as prior art, having been published in December 2003.

12. As of June 2004, the Office is no longer mailing paper copies of cited U.S. patent and U.S. patent application publications with Office actions from TC 1700. The cited patents and patent application publications are available for download via the E-Patent Reference feature of the Office's PAIR system.

13. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for Art Unit 1774 is (703) 872-9306 for all official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY
July 08, 2004

Marie R. Yamnitzky

MARIE YAMNITZKY
PRIMARY EXAMINER
1774